



Ethnobotany of *Dacryodes edulis* (G.Don) H.J. Lam in Southern Nigeria 2: Practices and applications among Igbo-speaking people

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Research

Abstract

The Igbos of Southeast Nigeria believe **ube** (*Dacryodes edulis* (G.Don) H.J. Lam) originated in the region. The plant is heavily cultivated around homes, homesteads, and village centers as a preferred reception/meeting point. It constitutes a key auxiliary income source for farmers, women, and vendors alike. The whole plant and/or its parts are associated with several practices and applications amongst the Igbo tribal people. It is preferable to soften the fruit with hot ashes and eat it with maize. The people utilize the plant's medicinal properties for managing a vast number of health conditions. In some areas, the plant is venerated as "pure" or "sacred" because of historical mysterious events linked to it. The idioms and proverbs relating to the plant show the importance of **ube** in the Igbo cultural system. These connections cut across worship, marriage, birth, chieftaincy/coronation, dispute, recreation, construction, and craftworks. Ardent efforts are required to preserve this rich ethnobotanical knowledge as well as a section of the plant's (small-sized fruit) germplasm, which is threatened by the prevailing trade and domestication trends that favor large-sized fruit types within and beyond the tribal confines.

Introduction

African pear (*Dacryodes edulis* (G.Don) H.J. Lam) is a well-known plant in West Africa. The fruit are edible, and the bark; leaves, stem, and roots are employed for a variety of purposes (Jirovetz *et al.* 2003, Neuwinger 2000, Waruhiu *et al.* 2004). The fruit pulp may be cooked (softened) or eaten raw. Cooked flesh of the fruit has a texture similar to butter. Oil from the fruit is rich in amino acids and triglycerides and can augment common household oils (Ajiwe *et al.* 1997, Ikhouria & Maliki 2007, Kapseu & Tchiegang 1996). The seeds contain oil with nutritional

value that can supplement animal feed (Ajiwe *et al.* 1997, Leakey 1999, Obasi & Okoli 1993, Omoti & Okiy 1987). The fruit are sold in local markets and, to some level, have attracted international trade (Ajibesin 2011, Awono *et al.* 2002). The wood of *Dacryodes* has general use for carpentry, tool handles, and occasionally for construction. The stem exudates serve as glue, cosmetic components, or for lighting. The plant improves soil quality and contributes greatly in traditional medicines (Ajibesin 2011, Dalziel 1937).

Indigenous people around the world possess unique knowledge of plant resources on which they depend for food, medicine, and general utility, including tremendous botanical expertise. Human dependence on plants for livelihood is primarily connected to domestication efforts of indigenous people, which have led to the development of specific knowledge on plant use, management, and conservation (Cotton 1996, Martin 1995). Hence, indigenous people are the major custodians of knowledge on endemic biodiversity with which they have been intricately involved.

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Description of *Dacryodes edulis*

Dacryodes edulis (Burseraceae) is a medium-sized, ever-green, oleiferous fruit tree native to southern Nigeria and perhaps to Cameroon, attaining a height of 18–40 m in the forest but not exceeding 12 m in plantations. (Vivien & Faure 1996). It is generally branched from low down, with a deep, dense crown. The bole is rather short, slightly fluted, 50–170 cm in diameter, and more or less sinuous. The scented, pale grey, rough bark exudes a whitish resin. Buttresses are absent.

Leaves compound, imparipinnate, with 5–8 pairs of leaflets. Fruit are ellipsoidal to ovoid drupes, rather variable in size, 4–12 × 3–9 cm, with thin, pink exocarp becoming dark blue to violet at maturity; pulp firm and thin. The fruit is of two varieties: var. *edulis* and var. *parvicarpa* Okafor. Variety *parvicarpa* is small, rounded, more or less conical, and usually less than 5 × 2.5 cm, while var. *edulis* is elongated/ellipsoid and usually more than 5 × 2.5 cm (Kapseu & Tchiegang 1996, Mbagwu *et al.* 2008, Okafor 1983). The common names are (in English) African pear, African pear tree, bush butter, bush butter tree, bush fruit tree, eben tree, native pear, and (in French) **safoutier** (Burkill 1985).

Igboland and Igbo traditional society

Pottery evidence dates the Igbo heartland to as early as 4500 BCE, where the Nri city, considered to be the foundation of the Igbo culture, is traced to its founder, the patriarchal king figure and “sky-being” Eri (Griswold 2000, Isichei 1976, 1997). Though possibly originating as a theocracy, the Igbo socio-political system developed into a fragmented quasi-egalitarian republican system noticeable as far back as the 15th century. A council of elders called the **umunna** managed these societies. (Agbasiere 2000, Chigere 2001, Ndukhaihe & Fonk 2006). The present day Igboland covers five states: Abia, Anambra, Ebonyi, Enugu, and Imo, although neighboring non-Igbo states like Delta and Rivers have Igbo-speaking clusters (Uchem 2001). The British colonial and post-colonial Nigerian state influences notwithstanding, a sizeable aspect of the Igbo socio-cultural identities have been preserved and form the core attributes of interest in this study, with particular interest in the place and role *D. edulis* may play in this socio-cultural setting.

Ethnobotanical studies and interactions with indigenous people often reveal the cultural attitude and perspectives of a people on the uses of bio-resources within their communal confines. These preliminary works are often major steps in the successful bio-prospection, domestication, and improvement of plant species of importance, particularly where such species and the indigenous knowledge about its utilization are threatened in some way (Ozgen *et al.* 2004). A recent study records the genetic diversity of *D. edulis* as threatened by a selective domestication trend

directly connected with farmer/vendors’ preferences for particular fruit types within the region and beyond (Omonhinmin & Idu 2012).

Study objectives

The aim of the study is to exhaustively evaluate and record the indigenous knowledge on the use of *D. edulis* by the Igbos of southeastern Nigeria.

Methods

Study area

The study area lies between 5.25°N–6.30°N and 7.00°E–8.05°E within the humid and sub-humid tropical forest of Nigeria (Figure 1). The field study (2006–2009) centered on Igbo villages/clans in five states: Abia, Anambra, Ebonyi, Enugu, and Imo, Southeast Nigeria.

Respondents were administered a semi-structured questionnaire (Martin 1995), and conversations with some respondents were held with the help of local assistants with the goal to appropriately document and preserve the knowledge on the species. Respondents were interviewed on why the plant was considered important, which parts are used, and for what purposes. Questions asked related to the significance, uses, traditions, and stories (idioms, proverbs, sayings) respondents know about *Dacryodes edulis*. Where respondents disclosed information on the use of other plants alongside *D. edulis*, they were questioned further regarding such plants. Investigators undertook guided tours of homesteads, markets, and shrines where it was applicable and permissible.

The survey covered 200 informants (40 respondents per state), consisting of farmers, vendors, herbalists, local midwives, family heads (**diopkas**), and community leaders. The respondents include 20 herbalist/traditional healers, 20 community leaders, 100 farmer/family heads, 50 vendors, and 10 midwives. Twenty-eight percent of the sampled informants were females with an average age of 40 years. The male informants had an average age of 49 years.

It is customary to inform community heads of researchers’ intentions and to gather information on respondents with most probable knowledge about the species before approaching anyone in their domain. The interview of family heads (**diopkas**), farmers (males), women, herbalists, and midwives followed afterward. All informants gave informed consent to the interviews, and herbalists in particular signed Material Transfer Forms (Omonhinmin 2012).

Informants provided details on various applications and practices involving the species, the plant parts used, and the methods of administration. Specimen vouchers and

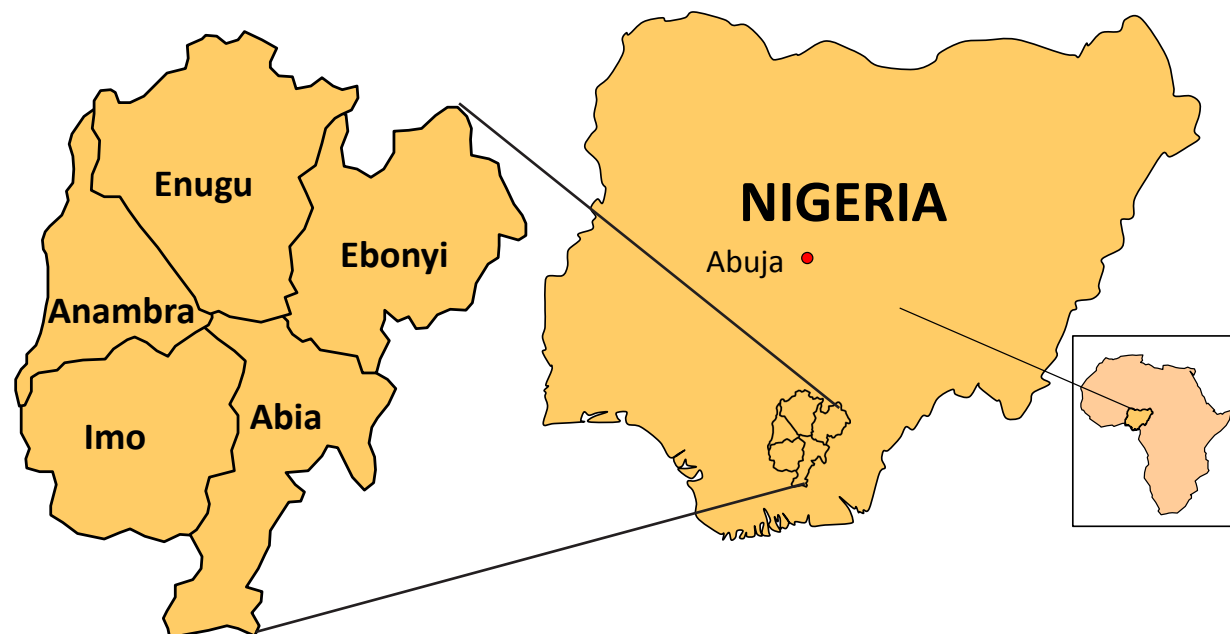


Figure 1. Field study area of Igbo villages/clans in five states in Southeast Nigeria: Abia, Anambra, Ebonyi, Enugu, and Imo.

pictures of the plants, scenery, shrines, and markets were deposited at the University of Benin Herbarium, Benin City.

Results and Discussion

Dacryodes edulis (ube) and Igbo customs

In the southeast Igbo-speaking area of Nigeria, **ube** is the exclusive name given *Dacryodes edulis*. The plant is probably one of the very few with a consistent name across a socio-politically fragmented area like Igboland (Omonhinmin 2012). The uniformity in the plant's name across the entire region reflects the homogeneity of belief surrounding the plant and thus the degree of cultural cohesion amongst the people. Indigenous belief has it that the plant, as well as yam (*Dioscorea* sp.), originated from the region, and the tribal people rank it only behind yam in economic standing and behind kola (*Cola* sp.) in the spiritual/cultural ranking of plants. **Ube** is therefore engaged in several ways in the various aspects of peoples' lives.

Engaging **ube** in Igbo custom portrays the people as a cultural rich and interesting tribe. The Igbos engage in symbolism as a nonverbal but effective and non-violent way of communication, both within and beyond the family circle. The customs around **ube** reflect this rich tradition across the entire Igboland.

For instance, in Amichi Village (Nnewi South) and its adjoining clans, a man dissatisfied with his wife would commence his divorce intentions with **ube** leaf (**aji akwukwo**

ube egosi njedebe di na nwunye) by taking along with his wife a keg of palm wine to his father-in-law and covering the keg with the leaves upon reaching his in-laws. Where the woman commits adultery and the husband is unwilling to continue with the marriage, he sends her with a keg of palm wine stuffed with **ube** leaves to her father, accomplishing **ubebelu** in the process, a condition of "never to return" to her matrimonial home.

It is customary to soften **ube** with hot ashes before eating. This act connects to a saying by the elders, "**Ogaranya anaighi alacha ntu, ube mere ka ogaranya soro ogbenye lacha ntu**," meaning "a rich man may not succumb to lick dirt (ash) like the poor, but when he eats **ube** (hot ashes softened), he like the poor, also licks ash (dirt)."

Intimacies in relationships are often described using idioms in Igboland. In Nkpor Agu (Idemili South), the saying "**Enyi na enyi bu ofu dika ube na oka**" refers to friends that are inseparable like **ube** and **oka** (maize). This is because **ube** fruits and ripens during the maize season, and it is unthinkable amongst the Igbos to eat cooked, roasted, or fried **oka** (maize) without **ube**.

At playtime in Amudo (Akwa South), children sing "**Isi gi wa wa wa, isi gi wa ka mkpulu ube**" (Let your head break apart, like the **ube** seed) while they alternatively throw their **ube** seed against a wall. If a playmate's seed breaks, the thrower is eliminated and tagged "non strong-head." This continues until the last person is declared winner and is the one with the strongest head.

African pear for food

Igbo tradition has it that elders prefer **ube** fruit softened with hot ashes because the fruit may be rejected if prepared in any other way. They claim certain flavor comes with the ashes, but more importantly, eating the fruit with ash is a reminder to everyone of the equality of men. On the other hand, for less choosy persons, **ube** can be softened in hot water or on hot plate, salted, and eaten as a snack or with other food, principally roasted, fried, or boiled maize, and occasionally with bread, yam, soaked garri (cassava flakes), or rice (Ikhouria & Maliki 2007, Okeke *et al.* 2008, Omoti & Okiy 1987). Jam can be made from the softened fruit pulp. Oil generated from the fruit pulp complements regular cooking vegetable oils, and in Ovim village (Isuikwato), a local soup delicacy (**ofe ede**) is prepared using the oil.

The kernels (seeds) are fed to household livestock, particularly ruminants. The resin (stem exudates) is used for food thickening (Ekpa 1993), and during the flowering season the plant can be employed for apiculture and honey production. Ayuk *et al.* (1999) earlier reported similar findings. The logs make good firewood, and the aromatic smoke produced is good for curing meat and tobacco (Ayuk *et al.* 1999, Ekong & Okogun 1969). These applications are similar to those recorded for the western (Yoruba) neighbors of the Igbos, whose introduction to the fruit are linked to Igbo visitors (Omonhinmin 2012).

Ethnopharmacology of African pear

A majority of people in rural and semi-urban dwellings and a sizeable population in urban dwellings in developing countries like Nigeria rely on ethno-herbal formulations for

the management of several health conditions. The size of the population sourcing such herbal medications, and hence the type of herbal formulations used, is often a direct index of ethno-cultural connections.

One factor that endears a plant species to a people is its relevance to health management alongside other uses. Like the Yorubas, the Igbos generate several herbal formulations and medicinal applications using *D. edulis* for managing an array of medical conditions (Table 1). Such conditions include dermatological care (Ayuk *et al.* 1999, Dalziel 1937, Egharevba & Ikhatua 2008, Ekpa 1993, Hutchinson *et al.* 1963, Okwu & Nnamdi 2008) and oral conditions (Ajibesin *et al.* 2008, Burkill 1985, Igoli *et al.* 2005). Others include muscular, gynecological, gastroenterological, and general body care, as well as the management of fevers, ear troubles, retarded growth in children, insomnia, leprosy, and diabetes (Omonhinmin 2012).

Ground *D. edulis* seed mixed with palm oil is applied topically to treat mumps. The softened fruit pulp alongside avocado pear (*Persea americana* Mill.) is employed by young women as a facial beauty therapy, while the pulp oil and bark exudates are added to lotions or creams and applied to smoothen and protect the skin. The bark resin is rubbed to eliminate scars and for treating skin infections like crawl-crawl, ringworms, and tick and mite bites. Softened and salted fruit flesh is applied topically to dry up boils and relieve inflammation pains as Okwu and Nnamdi (2008) noted in their study.

Chewing *D. edulis* leaves or drinking the leaf juice relieves feverish conditions. Leaves boiled with pawpaw (*Carica papaya* L.), lemon grass (*Cymbopogon citratus* (DC.) Stapf) leaves, mango (*Mangifera indica* L.), and guava

Table 1. Medicinal uses of *Dacryodes edulis* (G.Don) H.G.Lam (African pear, **ube**) among the Igbos in southeastern Nigeria.

Uses	Parts used and preparation	Citations
Dermatological care		
Ectoparasite infection, skin diseases & disorders	Stem exudates (resin) are applied topically to treat crawl-crawl , ringworm, and parasitic bites from ticks and mites. Softened fruit pulp mixed with salt is applied on boils to dry up the boil and relieve pain.	Dalziel 1937, Egharevba & Ikhatua 2008, Hutchinson <i>et al.</i> 1963, Okwu & Nnamdi 2008
Skin smoothening (lotion)	Young women apply softened fruit pulp and avocado pear (<i>Persea americana</i> Mill.) as a facial beauty therapy. Cosmetics are made from seed oil, and stem exudates are used to smoothen and protect the skin.	Ayuk <i>et al.</i> 1999, Ekpa 1993
Skin abrasions, cuts, scratches, & wounds	Stem exudate is applied topically to treat scars and wounds.	
Oral health		
Toothache, gum problem, gargle, mouthwash, tonsillitis, mumps	Leaf concoctions are applied directly for toothaches. Young branches are chewed as chewing sticks. Seeds are ground and mixed with palm oil to treat mumps.	Ajibesin <i>et al.</i> 2008, Burkill 1985, Igoli <i>et al.</i> 2005

Uses	Parts used and preparation	Citations
Fevers		
Malaria/high fever	Leaves are chewed or juiced and drunk to help lower feverish conditions. Leaves or bark are boiled with leaves/ bark/root of <i>Carica papaya</i> L., <i>Mangifera indica</i> L., <i>Psidium guajava</i> L., and <i>Cymbopogon citratus</i> (DC.) Stapf for treating malaria. A leaf decoction is prepared as a vapor-bath to relieve feverish stiffness with headache.	Omonhinmin 2012
Muscular/ bone conditions		
Arthritis, muscle pain/stiffness (e.g., cramps), inflammation, muscle relaxation	Regular consumption of fruit lowers the risk of age-related muscular degeneration. Juice relieves pain related to various inflammatory conditions. The leaf/bark is used for bone strengthening and setting products.	Omonhinmin 2012
Ear troubles		
	Leaf concoctions are applied directly for earaches. Leaf-sap is instilled into the ear to relieve ear pains.	
Gastroenterological conditions		
Stomach disorder, constipation, digestive tract discomfort, indigestion, heartburn	Leaf decoctions or softened fruit are taken to relieve constipation. Leaf concoctions are used to treat digestive tract infections and discomfort.	Omonhinmin 2012
Dysentery & anemia	Crushed leaves, juice, or bark decoctions are used for treating dysentery and anemia. Bark or root decoction is used for treating piles.	Omonhinmin 2012
Beri beri, rickets, & ulcers	Fruit oil is used for treating ulcers.	Omonhinmin 2012
Emesis: Vomiting & nausea	The tender leaves are chewed with kola nut as an antiemetic and for nausea.	
Gynecology		
Ease labor pains, safe delivery, menstruation	Leaf decoctions with other materials is claimed to help reduce the instance of postmenopausal breast cancer. During delivery, ground leaves mixed with water and salt are applied to a pregnant woman's face and belly to ease labor pain and eliminate complications.	Omonhinmin 2012
Sundry disease conditions		
Stress, internal body heat, etc.	Fruit is eaten to improve one's general health, and leaf juice as an energy drink.	Omonhinmin 2012
Hypertension	Leaf/bark decoction is administered to manage high blood pressure and heart problems (and to lower cholesterol levels).	Omonhinmin 2012
Retarded growth in children	The roots are boiled with unripe pawpaw fruits in pap water (water drained from ground and soaked maize) and for treating retarded growth in children.	Omonhinmin 2012
Insomnia & cough	The tender leaves are chewed as a relaxant for managing insomnia.	
Leprosy	Root decoction is administered for leprosy.	Omonhinmin 2012
Diabetes/blood sugar	Dried and powdered seed is taken as tea for managing diabetes.	

(*Psidium guajava* L.) leaves/bark are administered for malaria. A leaf decoction is prepared as a vapor-bath to relieve feverish stiffness and headache.

Eating the fruit (high fiber content), drinking the leaf concoction, or chewing fresh tender leaves helps improve bowel movement and relieves constipation and other digestive tract discomforts. Dysentery and *jedi-jedi* (piles) are treated with bark and root decoctions. The leaves are chewed with kola nut (*Cola acuminata* (P. Beauv.) Schott & Endl.) as an antiemetic (anti-vomiting). Bouet (1980) and Bouquet (1969) reported similar treatments for fever, headache, pains, debility, stiffness, and skin diseases as well as use as an antiemetic in the Democratic Republic of Congo (DRC).

Other claims include the ability of the fruit to lower blood pressure and reduce the chances of a stroke. Direct application of a leaf infusion is said to be good for tooth- and earache. The resin is used in the making of local tooth-pastes, and young branches are chewed as chewing sticks. This is congruent with earlier reports by Igoli *et al.* (2005) and Ajibesin *et al.* (2008).

Leaf juice serves as a ready energy drink. This assertion, along with another about the repelling force of the plant against evil spirits, makes it a valued material among local midwives. They grind the leaf with water and salt and apply the mixture to the face and belly of a woman in labor to relieve labor pains and ward off evil spirits. The midwives claim these twin effects prevent complications and death during the delivery.

To treat diabetes, sufferers drink dried and powdered seeds as tea. Ulcers are treated with the pulp oil. Tender leaves are chewed as a relaxant for managing insomnia. Bone strengthening and setting products are formulated from the stem exudates. Anemia is treated with a bark decoction of the plant, and the roots are boiled in **pap** water (water drained from ground and soaked maize) alongside unripe pawpaw fruit for treating retarded growth in children. Root/bark decoction works well in treating leprosy. Bouquet (1969) reported similar findings for treatment of leprosy in DRC.

Ube and spiritualism

Cosmo-visional disposition of a people is largely determined by their cultural bearing. Hence the perception of an organism relative to its status as "good" or "bad" will underscore the degree to which it is employed for spiritual activities and as such other aspects of individual and communal life. The Igbos consider the plant "good," "pure," or "clean" probably because they believe it has no harmful component and it has not been reported to cause death of persons or livestock after consumption. Findings by Obasi and Okolie (1993) and later by Ajibesin *et al.* (2002) while working with Akwa Ibom people, a neighboring tribe to the

Igbos, attested to the lack of toxic components in the plant and particularly in the fruit as recorded by Dike (2010).

Several communities use whole plants or parts of *D. edulis* for spiritual purity, as reported earlier by Sofowora (2008), and in some instance exorcism of some sort. Planting a tree close to shrines or placing leaves in a shrine or its vicinity confers spiritual purity or cleanliness. The Igbos believe the plant cannot harbor evil spirits or its parts be used for evil activities, and more importantly, it is believed to ward off evil spirits. The sweet-smelling smoke from burning the leaves or stem exudates is also said to ward off evil spirits. Similar applications were recorded amongst the Yorubas (Omonhinmin 2012). A child believed to be possessed by evil spirits is made to lie down amidst a circle of burning *D. edulis* leaves to exorcise the spirits. **Ube** leaves dipped in blood of a sacrificial animal are placed around a property considered defiled.

Handling plant parts is believed to confer spiritual protection on the holder. During spiritual exercises, such as the **iheneme** sacrifices in Ovim village (Isuikwato), the **dibia** (medicine man/priest) holds a branch of the plant across his mouth as protection against spiritual attack while he carries out his duties. As the maize season approaches in Ikenanzizi village (Obowo), the leaves and fruit are offered as a peace and fertility offering to the gods of the land for a bountiful harvest.

Economics of ube

Generally among the Igbos, **ube** is considered a totem of purity, well-being, and prosperity. It ranks probably only behind yam (*Dioscorea* sp.) in the economic ranking of plants by this tribal people, and it is believed to have a great power of spread with respect to trade beyond the region.

The harvest and sales of **ube** fruit strategically coincides with the maize harvest season of the year when yam (the chief economic crop of the people) is out of season and most farmers are low on finances. **Ube** fruit is therefore a major trade product for that season and a key auxiliary revenue target for farmers and vendors alike (Anegbeh *et al.* 2005, Leakey 1999). Families and individuals particularly target the harvest and sales of **ube** fruit for major projects like building new or repairing houses and barns, procurement of marriages and chieftaincy titles, or payment of school tuition fees. Families with a sizeable number of **ube** trees are regarded as prosperous and a good family to marry into, as one is certain to share of the **ube** wealth of the in-laws.

The people expectedly put a great deal of effort toward managing the plant, particularly during fruiting to ensure a good harvest. For instance, in Amudo village (Awka South), to prevent premature dropping of the fruit in large numbers, it is customary to tie a broken earthenware pot

(ite-ona) around the tree trunk using palm fronds (**omu nkwu**) and afterward spread ashes around the base of the tree. Since only peripheral Yoruba (most eastern) areas cultivate the plant, the patterns of economic transactions differ between the Igbos and Yorubas. The Igbos are major cultivators and hence suppliers of the fruit to the Yoruba areas, making the Yorubas principal consumers. This difference also determines how the plant is ethno-economically viewed in both regions and is responsible for a westward-oriented trade and, probably inadvertently, a domestication trend over time (Omonhinmin 2012).

Ube and guest reception

The plant is common around houses, homesteads, and village centers where meetings are held. Because of its purity, homeowners plant at least one tree of *D. edulis* near their houses. New houses have *D. edulis* seedlings planted, particularly at the front area of the house, to be used as a reception point afterward, when the tree has grown a considerable crown for shade. Where a plot of land intended for building already has **ube** plant(s), the property owner is considered blessed and will erect the building appropriately close to the plant(s). Respected visitor(s) are received under the tree by the house head (**diokpa**).

Where kola is not readily available, the fruit is served to guests, when in season. It is offered as a gift or token to friends and relations. Presenting *D. edulis* fruit in any form, whether cooked, roasted, or raw, is a sign of respect for the guest. The fruit could be served as a refreshment to visitors or guests or to fellow group members of the same age as a mark of friendship or acceptance.

During traditional marriage ceremonies, the fruit are served as a sign of acceptance of the groom's entourage; it is shared to show love and peace. Fresh leaves are gathered in a basket and presented to the groom's family, symbolizing the maiden is a virgin. A married couple is presented with *D. edulis* fruit as a gift or the tree is planted in their compound signifying fruitfulness of marriage. During celebration of a new birth, friends and relatives present the fruit and leaves to the mother and child as a celebration of life and good health (Omonhinmin 2012). During chieftaincy or coronation ceremonies in Arochukwu, the title recipient's head gear and staff are decorated with **ube** leaves to show that the recipient is of good character and has been accepted by the gods.

Omen, disputes, and ube

The tree stands as a symbol of peace; the way it is used or misused may indicate peaceful or confrontational stance by the person(s) engaged in such acts. In places like Arochukwu, setting an **ube** tree on fire is a confrontational posture, and the perpetrator is regarded as the aggressor. To brandish **ube** leaves on fire around the community by

the **ohajioku** (chief priest) is a strong warning of impending ill occurrences, the levels of which require the attention of the whole community.

Resolving disputes between communities and individuals is considered to commence on a rightful note if one or both parties presents **ube** leaves to the other. While talks last, attending meetings with kegs of palm wine stuffed with **ube** leaves by both parties is a sign that the talks are proceeding in the right direction and a good settlement can be hopefully reached. At the final settlement—for example in Umudim, Amichi (Nnewi South)—the two parties are made to eat of the same **ube** fruit (**anyi ji ube edozi esemokwu na ogbahara**), an indication that the parties are united and are no longer in dispute or divided.

Sacredness of ube trees

Across the entire Igboland, **ube** holds varied positions in different communities. In general, the plant is prized for its economic, aesthetic, and recreational value. However, in some communities, the plant occupies a more important and, in some extreme cases, "sacred" status.

In Atanni Village (Ogbaru) members of the community are forbidden to cut, climb, eat of its fruit, or defile the plant in any way. Folklore has it that during a particular dreadful war, the tree provided refuge and hideout for the people, and a particular family hid in a hole at the bottom of an **ube** tree protected from their enemies. Hence, after the war, the community elders decreed the worship of **ube** tree and subsequently a curse on anyone who would denigrate the plant in any way. People who disobeyed were said to have suffered swollen lips.

In Arochukwu (Arochukwu) **ube** is considered "pure" or "sacred" and must not be used for any evil activity. Rather the leaves are placed in shrines, or a tree is planted close to the shrine to ward off evil spirits. In Umunya community (Oyi) the plant has attained a "child" status and no part of it must be defamed. Cutting a *D. edulis* tree is sacrilege, and ill luck will befall the offender. Women do not climb the tree, and virgins are forbidden to collect out-of-season **ube** fruit or their wedding day will be disturbed by unstoppable rain.

African pear in art and craftworks

Some areas in Igboland regard the **ube** wood to be nearly as good as African mahogany. The trunk and strong branches are used in the erection of bridges, huts, hedges, fences, barns, and animal pens but not in house roofing. In addition, it can be employed for constructing handles of farming implements like hoes, shovels, spades, and rakes and household tools like axes, pot spoons, mortars, and pestles. Earlier reports by Dalziel (1937) and recently by Ajibesin (2011) confirmed such uses. The wood is good for making wooden furniture like slouching chairs for el-

ders and stools. Smaller branches are used for staking of yams, particularly **una**, the three-leaved yam (*Dioscorea alata* L.).

Artisans make sculptures and the traditional flute blown during ceremonies from **ube** wood. The bark when scraped and left for a few days generates exudates used as fish bait (**anyi ji ube egbu azu**) and as adhesive for paper or leather craftwork (**eji emeputa mgbu**). In addition, the inner surfaces of calabashes and earthenware are pitched with the **ube** glue (resin), and the leaves yield a dye for decorating arts and house wares (Burkill 1985).

Sustainable use and conservation status of *Dacryodes edulis*

Local cultures and specific attributes are key to determining the choice of plant and plant parts consumed by local inhabitants (Jain 2000). The array of fruit shapes observed for *D. edulis* among the Igbos (up to 7 fruit types) links to a rich genetic diversity of the species, ranging from the small-sized, ovoid fruit to the large-sized, ellipsoidal fruit. Earlier fruit diversity studies by Omonhinmin and Idu (2012) on *D. edulis* in southern Nigeria show the species possesses a greater degree of distinct accessions than the two varieties described by Okafor (1983). Similarly, the study revealed a trend that linked directly to the seasonal production and sales of *D. edulis* in southern Nigeria from the east toward the west. This trade pattern has also encouraged a domestication trend that spread westward from the east and supports only the market-friendly large-sized fruit, excluding the smaller-sized fruit types.

These smaller-sized fruit types are increasingly restricted to a narrow geographic distribution and are less considered by the people for sale. It was not uncommon to see baskets of the small-sized fruit unsold or abandoned in both local and central markets. Another unsettling trend observed was the neglect and deliberate felling of small-sized fruit trees or attempts to replace such trees with the large-sized fruit tree seedlings. In addition, these less-fancied fruit types were traded only at the distal part of the fruiting season when the harvests of the large-sized fruit have considerably dwindled. These ominous signs of a particular fruit germplasm neglect observed for *D. edulis* are worrisome. *Dacryodes edulis* fruit are mainly eaten fried, roasted, or boiled; however a few are used for medicinal preparations (Gill 1992), and the majority of these medicinal fruit types are of the small-sized fruit type. The medicinal potentials and the indigenous knowledge about them are localized and may not constitute enough incentive to change the trend.

Though participatory strategies for domestication, conservation, and improvement have been proposed with success in similar tree species like *Irvingia gabonensis* (Aubry-Lecomte ex O'Rorke) Baill. (Aiyelaagbe *et al.* 1998, Atangana *et al.* 2001, Leahey *et al.* 2003), such are not

presently executed for *D. edulis* in the region. Therefore, deliberate conservation efforts, whether *ex situ* or *in situ*, must be engaged to conserve all fruit and tree types if the erosion of a sizeable section of the genetic assortment of the species must be prevented. This is particularly true given that common cultural domestication practices cannot be relied on to conserve the accessions in question (Omonhinmin & Idu 2012).

Conclusion

The ethno-cultural relevance of *D. edulis* to the Igbo people is shown by the ethno-hegemonic influence of the plant, depicted by the homogeny of its name **ube** across the entire tribal region. The plant is probably one of the few that has a common name across the entire Igbo-speaking people and beyond. The plant ranks above several species and is second probably only to yam in economic terms and to kola in social and religious ranking of plants by the Igbos.

The fruit serves as a snack preferably eaten with cooked maize and occasionally with other foods. As a gift, **ube** fruit is regularly exchanged during ceremonies and makes a good substitute for kola. The plant constitutes a major income source for the people, and it is now a crop of considerable local and international trade. Communal and interpersonal interactions are tied to the plant. The tree is preferred for shade around houses and at communal centers for relaxation and for important assembly. Societal standing, communal warnings, initiation, and resolution of disputes are connected with the plant. The purity or sacredness accorded the plant endears it for communal and personal spiritual activities like exorcising and restraining of evil spirits and also places it as a symbol of prosperity in birth, marriage, chieftaincy, and coronation activities. The plant parts are used for the management of various health conditions, and the wood is good for craftworks, carpentry, firewood, and construction of roads, bridges, barns, and sheds.

The assortment of uses of *Dacryodes edulis* by the Igbos notwithstanding, a worrisome trade and domestication trend threatens the plant's genetic diversity and the indigenous knowledge that shaped the uses of the plant among this tribal people. Hence, conscious conservation efforts are required to preserve the diversity of plant germplasm and the array of ethnobotanical applications and practices linked with the species.

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women, and even children in the various villages and clans visited during the study.

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